E.O. Lawrence Berkeley National Laboratory
GRETINA MONTHLY PROGRESS REPORT
April, 2005

I. DEPUTY CONTRACT PROJ. MGR. ASSESSMENT

1. TECHNICAL AND PROGRAMMATIC PROGRESS AND ACCOMPLISHMENTS

- The GRETINA MIE schedule has been updated in preparation for a CD 2A/3A review.
- LN System Requirements Document has been submitted for review.
- FEA work on the Quarter Spheres continues
- Conceptual Design Review for the support structure is being scheduled.
- The GRETINA Safety Plan and Activity Hazard Document are drafted and have been submitted for signature.
- Risk Registry and rigorous contingency analysis has been completed

2. ACTIONS

N/A

3. COST AND SCHEDULE STATUS

3.1 VARIANCE ANALYSIS AND PROJECT COST PERFORMANCE REPORTS

		k$	
	Sched	**Act**	**Variance**
MIE	1,025.0	803.2	221.8
OPC	1,055.1	985.0	70.1

Variance Statement:

MIE schedule numbers have been updated to reflect the results of the recent project cost scrubbing and review. Certain activities have been rescheduled and others have had cost adjustments (see analysis attached). Primary component of the MIE variance is related to the Eurisys design contract (the $159k lien does not show up yet in the LBNL costs), and LN system costs at ORNL not yet recorded.

Project Impact:

These variances do not impact the MIE completion.

Corrective Action:

No action needed. Costs for detector design and LN System work will be recorded when received and eliminate these variances. Work is proceeding as planned in both cases.

3.2 MILESTONE STATUS

Milestone	Data
Lvl 1: CD 2/3A	6/22/05
Lvl 2: Award Contract Module 1	7/13/05
Lvl 3: Detector Procure Spec Complete	5/9/05
Lvl 3: Elec Req. Doc Complete	7/15/05
Lvl 3: Computing Req Doc Complete	7/15/05
Lvl 3: DSP Req & Spec Complete	12/2/05
Lvl 3: Elec Proto Cable Design Complete	12/9/05
Lvl 4: LN System Mech Design Complete	8/23/05
Lvl 4: Target Chamber Design Complete	10/13/05
Lvl 4: Elec Proto Local Trigger/Timing Req & Spec Complete	12/16/05

Comments:

Lvl 3: Detector Procure Spec Complete: We will review the design of the detector module in early June and then we will be able to complete the interfaces of the detector module.

3.3 PROJECT CRITICAL PATH ANALYSIS

The critical path continues to be the production and delivery of the Detector Modules. Placement of the order for the first detector is anticipated to be mid-July. We are awaiting CD 2A/3A to initiate this award.

II. DETAIL SUBSYSTEM STATUS

A. WBS 1.1. Mechanical

WBS 1.1.2 Mechanical Design

Technical Progress/Accomplishments

- LN System requirements document draft complete and waiting review.
- Tim Loew has continued with the FEA of the polyhedral approach to making a quarter sphere, solving many FEA problems. The polyhedral approach continues to look very promising. Tim has made the holes in the polygons of the polyhedron elliptical to more closely match the outline of the quad cap and given us more stiffness in the polygon.
- Daniel Gutknecht would like us to commit to a radial dimension of 625 mm from the center of the experiment to the flange on his quad detector ASAP. We are quite sure we can agree to this, but we need the check.
- We have agreed to Daniel's other requests, the 15 mm-thick 330 mm OD flange and its bolt pattern.

- Calculated the capacitance of an insulation scheme using .010" insulating washers and tubes in the detector-wedge plate interface.
- Daniel Gutknecht has specified the length of the detector to be quite a bit smaller than we allowed him. This is a great advantage as it makes the mounting smaller and therefore it will fit in MSU's limited space more easily.
- Work has started on the axle/hexapod/RR car layout and calculations.
- Preparation for a Conceptual Design Review for the GRETINA mechanical support structure is underway.

Significant Issues/Actions

Daniel Gutknecht (Eurysis) has not agreed yet to LBL's tolerances on the facets of a detector cap yet. He has only said the detectors will not run into each other. Work on this continues.

WBS 1.1 Variance Analysis (Cumulative To-date) ($k)

Sched	Act	Variance
196.0	179.0	17.0

Variance Discussion

Variance is primarily due to delay of costing on the LN System work at ORNL.

B. WBS 1.2 Detector Module

WBS 1.2.1 Procurement

Technical Progress/Accomplishments

Cost scrubbing and risk re-assessment of the whole project to allow more money for detector procurement is underway.

The planning for the procurement of the first 3 detectors as long-lead items under CD 2A/3A is completed. This plan has the initial award being placed in July 05, with delivery in July 06. On completion of acceptance tests, it is planned that the second detector will be awarded by Sept. 06 and the third by the end of January 07.

Significant Issues/Actions

The detector schedule has been adjusted to reflect the latest in cost and delivery data. This includes extensive analysis of the exchange rate issue and new data from the vendor on delivery times.

WBS 1.2.2 Test/Characterize Module 1

Technical Progress/Accomplishments

Effort on the characterization of the triple detector cluster continued.

Significant Issues/Actions

N/A

WBS 1.2 Variance Analysis (Cumulative To-date) ($k)

Sched	Act	Variance
288.2	76.1	212.1

Variance Discussion

Detector Engineering and Test efforts have run lower cost than planned to-date. Eurysis is progressing with the detector design effort, but no costs have yet been recorded.

C. WBS 1.3 Electronics

WBS 1.3.1 Requirement Document

Technical Progress/Accomplishments

We have continued the revision of the Electronics Requirement document with members of ORNL, ANL and LBNL.

Significant Issues/Actions

N/A

WBS 1.3 Variance Analysis (Cumulative To-date) ($k)

Sched	Act	Variance
9.2	8.0	1.2

Variance Discussion

N/A

D. WBS 1.4 Computing Systems

WBS 1.4.1 Requirement document

Technical Progress/Accomplishments

Refinements were made to the computing requirements document.

Significant Issues/Actions

N/A

WBS 1.4 Variance Analysis (Cumulative To-date) ($k)

Sched	Act	Variance
9.1	6.0	3.1

Variance Discussion

N/A

E. WBS 1.6 Project Management

WBS 1.6.1 Management

Technical Progress/Accomplishments

- Extensive work on cost "scrubbing" and risk re-assessment is under way.
- The Risk Registry for the whole project is been prepared.
- Contingency analysis based on the Risk Registry and using Monte Carlo simulations was completed.
- Upgraded for all major material procurements is also under way.
- Updated schedule baseline in MS Project for CD 2A/3A.

Significant Issues/Actions

Preparation for a meeting with DOE in Washington is the major focus of effort at this time. This meeting will take place May 17th in Germantown.

WBS 1.6.2 General Project Expenses

Technical Progress/Accomplishments

N/A

Significant Issues/Actions

N/A

WBS 1.6 Variance Analysis (Cumulative To-date) ($k)

Sched	Act	Variance
512.1	526.0	(13.9)

Variance Discussion

Major effort on project management to prepare for the meeting at DOE in May accounts for this variance.

E. WBS 1.7 Environment, Safety and Health

WBS 1.7.1

Technical Progress/Accomplishments

The GRETINA Activity Hazard Document (AHD) is in draft form and being reviewed by Divisional and EH&S staff.

Significant Issues/Actions

N/A

WBS 1.7 Variance Analysis (Cumulative To-date) ($k)

Sched	Act	Variance
10.2	8.1	2.1

Variance Discussion

N/A

III. Research and Development Status

Computing Systems:

- Tracked down the "missing words" error in digitizer readout and installed a software fix.
- Work on R&D data sender design and code
- Refine R&D data readout code
- Further tests and refinement of crystal event builder code
- Added global control of digitizer parameters to EPICS database
- Mario Cromaz completed comparisons of servers for R&D farm
- Begin receiver design

Electronics: We received two quotations for the cable connecting the pre-amplifiers with the readout electronics. We are reviewing them.

Significant Issues/Actions

N/A

R&D Variance Analysis (Cumulative To-date) ($k)

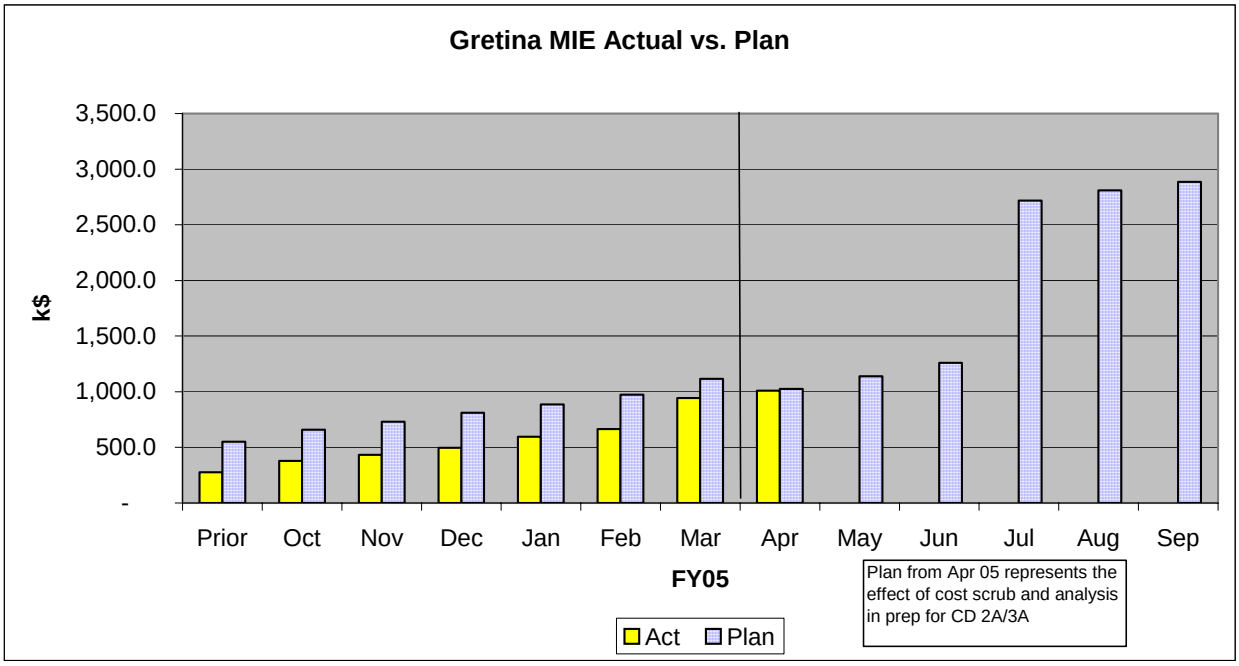
Sched	Act	Variance
1055.1	985.0	70.1

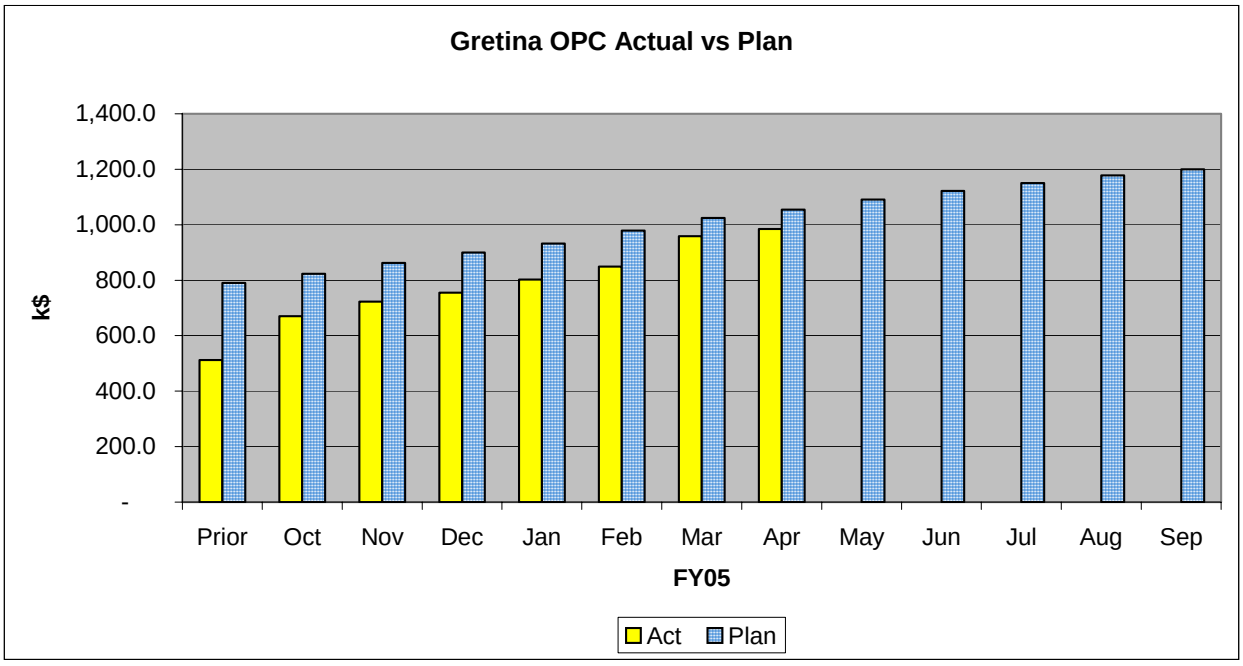
Variance Discussion

N/A

IV. Cost Chart

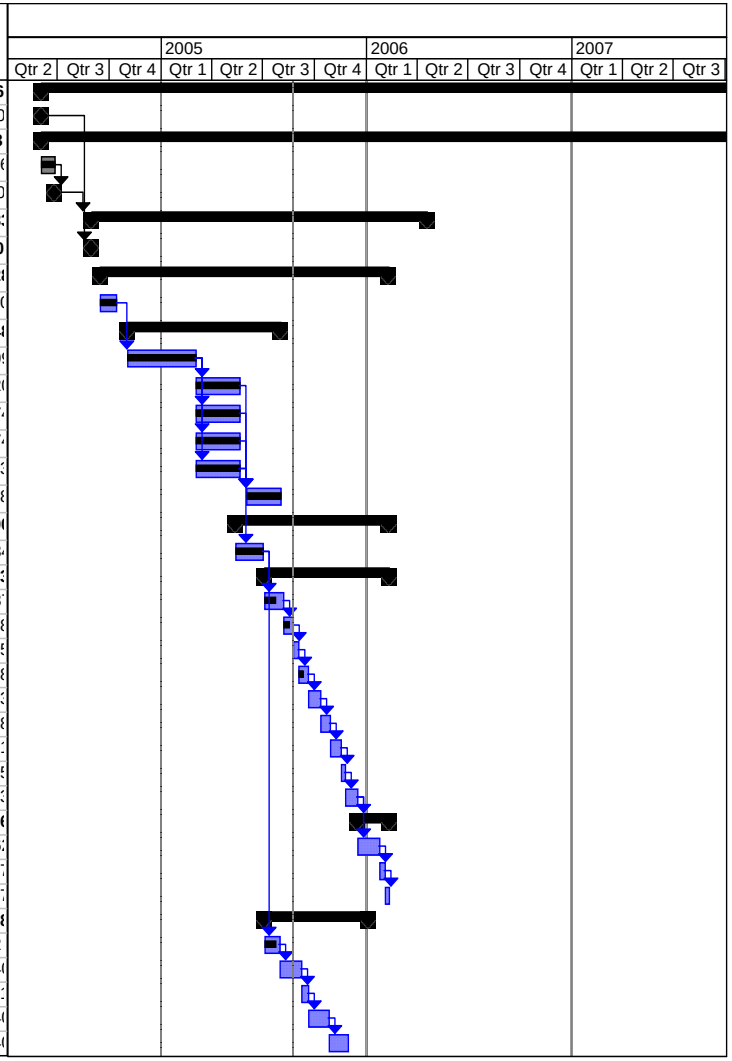
The above charts compare project-to-date budgeted cost with actual for the FY05 time period.





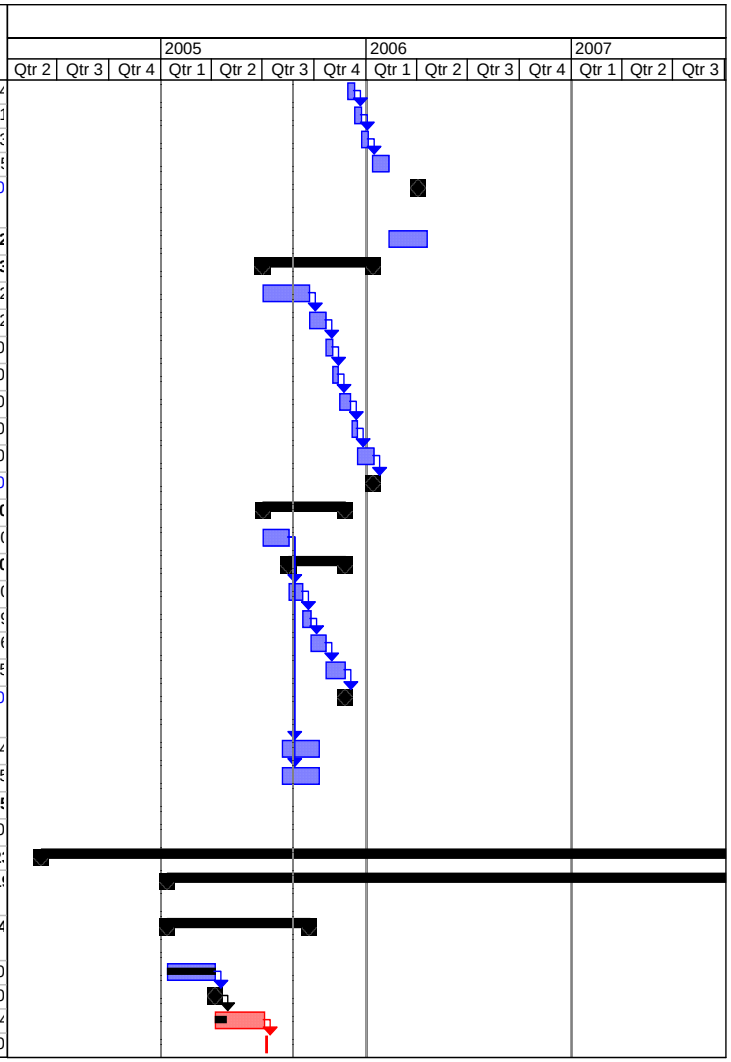
GRETINA Schedule April 2005

ID	Work Breakdown Ref	Task Name	% Complet	Start	Finish	Cost
1	**1**	**GRETINA**	**14%**	**3/1/04**	**9/16/10**	**$14,669,16**
2		**Level 1: CD-1**	0%	3/1/04	3/1/04	$0
3	**1.1**	**Mechanical**	**20%**	**3/1/04**	**4/3/08**	**$1,002,83**
4	**1.1.1**	Requirement document	100%	3/1/04	3/26/04	$9,06
5		Mech Req Doc Complete	100%	3/26/04	3/26/04	$0
6	**1.1.2**	**Design**	**40%**	**6/1/04**	**1/17/06**	**$445,48**
7		**Start Mech design**				**$0**
8	**1.1.2.1**	**Support structure**	**61%**	**6/15/04**	**11/9/05**	**$336,32**
9		Define requirements/spec	100%	6/15/04	7/13/04	$9,69
10		**Conceptual Design**	**100%**	**8/2/04**	**5/2/05**	**$105,44**
11		General Conceptual Design	100%	8/2/04	11/30/04	$50,59
12		Split Hemisphere	100%	12/1/04	2/16/05	$20,12
13		Rotation System	100%	12/1/04	2/16/05	$12,57
14		Translating Structure	100%	12/1/04	2/16/05	$12,57
15		Site Interface	100%	12/1/04	2/16/05	$5,03
16		Complete Conceptual Design	100%	3/1/05	5/2/05	$4,54
17		**Final design**	**23%**	**2/9/05**	**11/9/05**	**$221,19**
18		General Final Design	100%	2/9/05	3/31/05	$39,48
19		**Quarter Spheres**	**17%**	**4/1/05**	**11/9/05**	**$74,41**
20		Geometry and Layout	60%	4/1/05	5/5/05	$10,78
21		FEA	60%	5/5/05	5/23/05	$5,67
22		Specify Manufacturing Processes	0%	5/23/05	6/1/05	$2,55
23		Wedge Plates	40%	6/1/05	6/20/05	$5,67
24		Hexapod Interface Hub	0%	6/20/05	7/12/05	$6,81
25		Grounding and Electrical Isolation	0%	7/12/05	7/28/05	$5,67
26		Telephone Poles	0%	7/28/05	8/16/05	$9,48
27		Alignment Target Balls	0%	8/16/05	8/23/05	$2,55
28		Kinematic QuarterSphere Links	0%	8/23/05	9/14/05	$6,81
29		**Fabrication Prints**	**0%**	**9/14/05**	**11/9/05**	**$18,37**
30		Quarter Spheres	0%	9/14/05	10/24/05	$13,06
31		Grounding and Electrical Isola	0%	10/24/05	11/1/05	$2,65
32		Telephone Poles	0%	11/1/05	11/9/05	$2,65
33		**Translation and Rotation**	**12%**	**4/1/05**	**10/4/05**	**$91,52**
34		Layout	75%	4/1/05	4/29/05	$14,22
35		Tee Platform	0%	4/29/05	6/6/05	$17,54
36		Bearing Housing	0%	6/6/05	6/20/05	$7,11
37		Axles	0%	6/20/05	7/26/05	$17,54
38		Lower Strut Clips	0%	7/26/05	8/29/05	$17,54



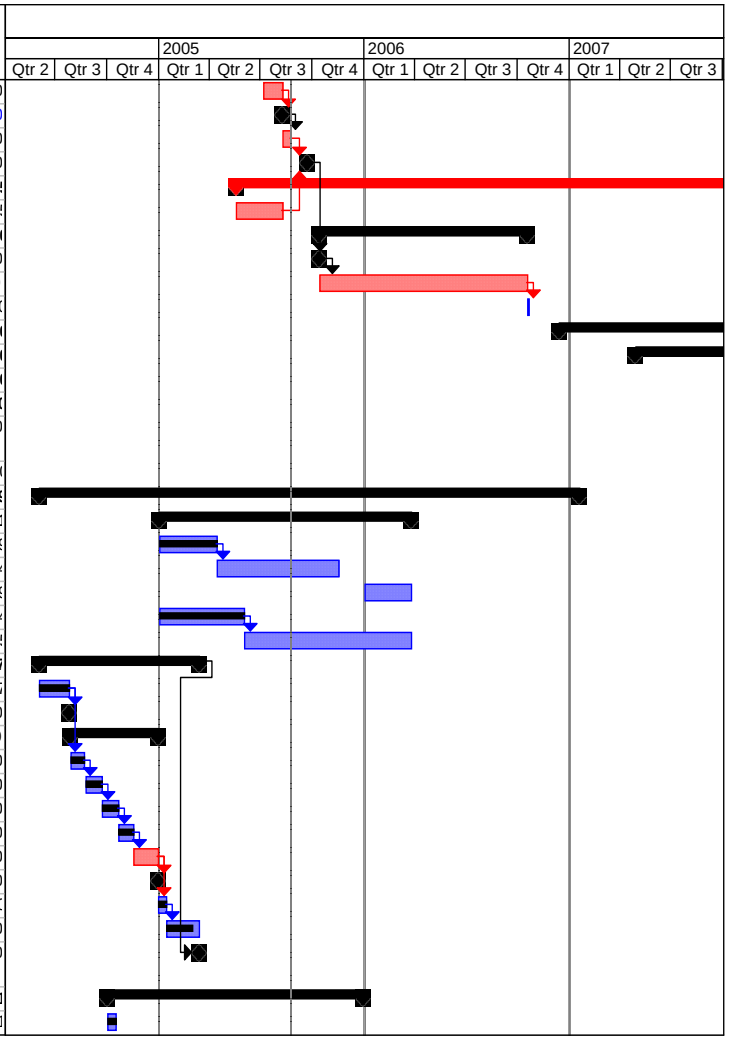
GRETINA Schedule April 2005

ID	Work Breakdown Ref	Task Name	% Complet	Start	Finish	Cost
39		Weldment - RR car and strut clips	0%	8/29/05	9/9/05	$5,214
40		RR Car mods - dwg & descr.	0%	9/9/05	9/23/05	$7,111
41		Strut drawing (tabulated)	0%	9/23/05	10/4/05	$5,253
42		Design Review	0%	10/12/05	11/9/05	$15,765
43		**Lvl 2: Complete Design and Drawings of Mech Support Structure**	0%	1/3/06	1/3/06	$0
44	**1.1.2.2**	**Detector installation tool**	0%	**11/9/05**	**1/17/06**	**$36,482**
45	**1.1.2.3**	**Target chamber Washington Univ.**	**0%**	**4/1/05**	**10/13/05**	**$10,903**
46		Define requirements	0%	4/1/05	6/22/05	$5,452
47		Design Specifications	0%	6/23/05	7/19/05	$5,452
48		Conceptual design	0%	7/20/05	8/2/05	$0
49		Conceptual design review	0%	8/3/05	8/12/05	$0
50		Final design	0%	8/15/05	9/2/05	$0
51		Final design review	0%	9/6/05	9/15/05	$0
52		Detail Dwgs	0%	9/16/05	10/13/05	$0
53		**Lvl 4:Target Chamber Design Complete**	0%	10/13/05	10/13/05	$0
54	**1.1.2.4**	**LN system**	**0%**	**4/1/05**	**8/23/05**	**$61,770**
55		Define requirements/specifications	0%	4/1/05	5/16/05	$10,420
56		**Mechanical**	**0%**	**5/17/05**	**8/23/05**	**$45,430**
57		Conceptual design	0%	5/17/05	6/9/05	$16,780
58		LN Interface	0%	6/10/05	6/23/05	$11,369
59		Final design	0%	6/24/05	7/19/05	$12,260
60		Detail Dwgs	0%	7/20/05	8/23/05	$5,015
61		**Lvl 4: LN System Mech Design Complete**	0%	8/23/05	8/23/05	$0
62		Electrical	0%	5/3/05	7/8/05	$3,214
63		Computer control	0%	5/3/05	7/8/05	$2,705
64	**1.1.3**	**Production**	**0%**	**7/11/07**	**4/3/08**	**$548,285**
98		**Level 2: Mechanical Production Complete**	0%	4/3/08	4/3/08	$0
99	**1.2**	**Detector Module**	**12%**	**3/1/04**	**9/8/09**	**$8,149,823**
100	**1.2.1**	**Purchasing**	**3%**	**10/11/04**	**6/12/09**	**$7,754,115**
101	**1.2.1.1**	**Detector requirements and procurement specs**	**44%**	**10/11/04**	**6/22/05**	**$5,054**
102		Write Detector requirements	100%	10/11/04	1/5/05	$0
103		Detector Req Doc Complete	0%	1/5/05	1/5/05	$0
104		Define interfaces	20%	1/6/05	4/1/05	$5,054
105		Define Interfaces ETC	0%	4/4/05	4/4/05	$0



GRETINA Schedule April 2005

ID	Work Breakdown Ref	Task Name	% Complet	Start	Finish	Cost
106		Write procurement specification	0%	4/5/05	5/9/05	$0
107		**Lvl 3: Detector Procure Spec Complete**	0%	5/9/05	5/9/05	$0
108		Receive bids	0%	5/10/05	5/23/05	$0
109		**LVL 1: CD 2/3A**	0%	6/22/05	6/22/05	$0
110	**1.2.1.2**	**Detector Procurement**	**0%**	**2/15/05**	**6/12/09**	**$7,749,06**
111		Detector Design Contract	0%	2/15/05	5/9/05	$174,28
112		**FY05: Detector Module 1**	**0%**	**7/13/05**	**7/18/06**	**$1,400,78**
113		**LVL 2: Award Contract Module 1**	0%	7/13/05	7/13/05	$0
114		Module 1 Fab and Delivery	0%	7/14/05	7/17/06	$1,368,00
115		Flat Procurement Burden	0%	7/18/06	7/18/06	$32,78
116		**FY06: Dectector Module 2**	**0%**	**9/12/06**	**9/14/07**	**$1,062,00**
119		**FY07: Dectector Module 3, 4 & 5**	**0%**	**1/26/07**	**10/16/08**	**$3,050,00**
124		**FY08: Dectector Module 6 & 7**	**0%**	**2/1/08**	**2/13/09**	**$1,339,00**
128		**FY09: Detector Module 7 (Final)**	**0%**	**1/30/09**	**6/12/09**	**$723,00**
129		**Lvl 2: Award Contract for Final Portion of Mod 7**	0%	1/30/09	1/30/09	$0
130		Module 7 Part 2 Fab and Delivery	0%	1/30/09	6/12/09	$723,00
131	**1.2.2**	**Test/Characterize Module 1**	**33%**	**3/1/04**	**10/19/06**	**$308,94**
132	**1.2.2.1**	**Detector Engineering and Test**	**28%**	**10/1/04**	**12/22/05**	**$266,96**
133		Detector Engineer (FY05)	100%	10/1/04	1/11/05	$20,16
134		Detector Eng ETC	0%	1/11/05	8/16/05	$57,78
135		Detector Engineer (FY06)	0%	10/3/05	12/22/05	$49,68
136		Detector Testing	100%	10/1/04	2/28/05	$22,41
137		Detector Testing ETC	0%	3/1/05	12/22/05	$116,90
138	**1.2.2.2**	**Develop test procedures and apparatus**	**80%**	**3/1/04**	**12/10/04**	**$9,917**
139		Develop test procedures	100%	3/1/04	4/23/04	$2,76
140		Detector Test Procedures Complete	100%	4/23/04	4/23/04	$0
141		**Develop test software**	**73%**	**4/26/04**	**9/29/04**	**$0**
142		Determine energy and time resolution	100%	4/26/04	5/21/04	$0
143		Noise analysis	100%	5/24/04	6/21/04	$0
144		Pulse shape analysis	100%	6/22/04	7/20/04	$0
145		Compare with simulation	100%	7/21/04	8/17/04	$0
146		Interfaces	0%	8/18/04	9/29/04	$0
147		Detector Test Software Complete	100%	9/29/04	9/29/04	$0
148		Assemble test apparatus	100%	9/30/04	10/13/04	$7,15
149		Tests and performance characterization	75%	10/14/04	12/10/04	$0
150		**Level 2: Detector Test Procedures and Apparatus Complete**	0%	12/10/04	12/10/04	$0
151	**1.2.2.3**	**Develop database**	**14%**	**7/1/04**	**9/29/05**	**$32,07**
152		Define database requirements	100%	7/1/04	7/15/04	$1,37



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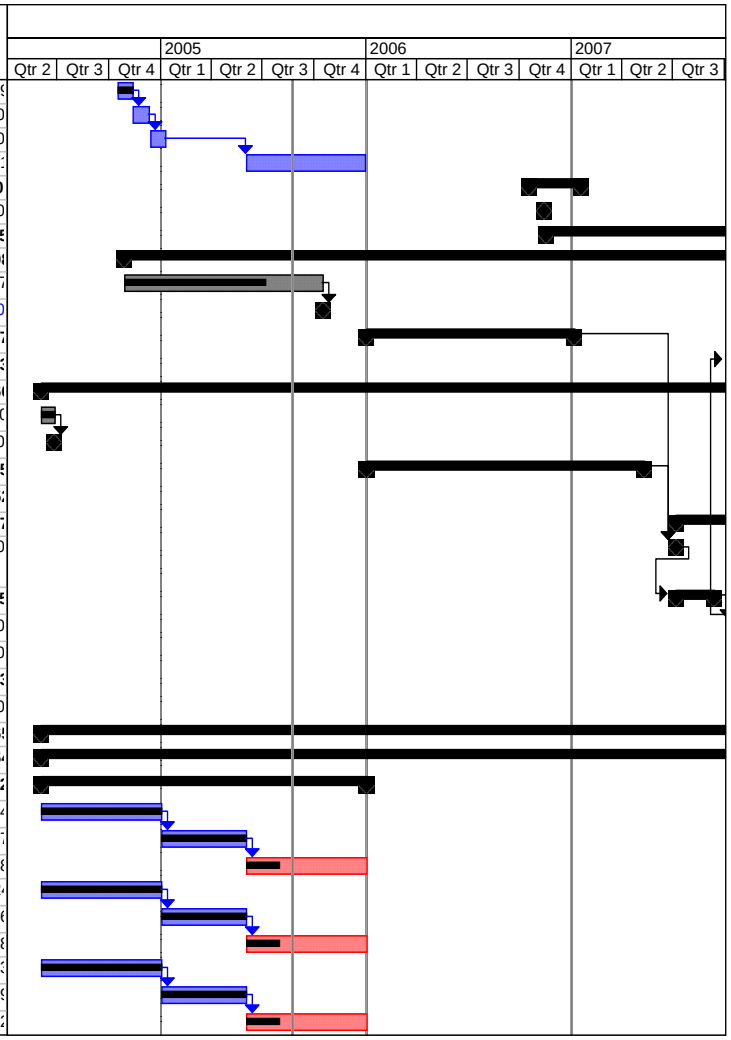
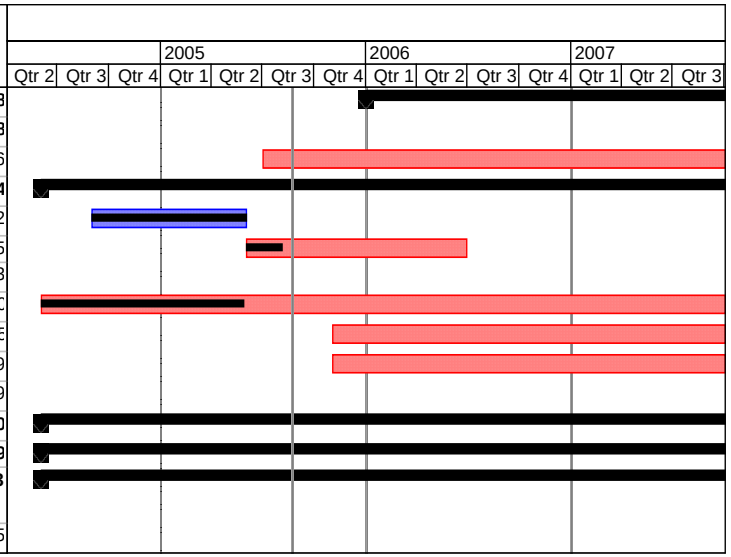
ID	Work Breakdown Ref	Task Name	% Complet	Start	Finish	Cost
153		Define backup and recovery	100%	7/16/04	8/12/04	$13,709
154		Select and procure package	0%	8/13/04	9/10/04	$0
155		Customize System	0%	9/13/04	10/8/04	$0
156		Contine support	0%	3/1/05	9/29/05	$16,99
157	**1.2.2.4**	**Test/characterize Module 1**	**0%**	**7/18/06**	**10/19/06**	**$0**
162		**Lvl 2: Complete Mod 1 Acceptance Test**	0%	8/15/06	8/15/06	$0
163	**1.2.3**	**Test/Char Mod 2 thru 7**	**0%**	**8/16/06**	**9/8/09**	**$86,75**
205	**1.3**	**Electronics**	**13%**	**7/28/04**	**8/13/08**	**$1,388,69**
206	**1.3.1**	Requirement document	70%	7/28/04	7/15/05	$9,17
207		**Lvl 3: Elec Req. Doc Complete**	0%	7/15/05	7/15/05	$0
208	**1.3.2**	**Electronics Prototype**	**0%**	**10/3/05**	**10/6/06**	**$554,08**
277	**1.3.3**	**Electronics Production**	**0%**	**7/11/07**	**8/13/08**	**$825,43**
338	**1.4**	**Computing Systems**	**1%**	**3/1/04**	**4/7/09**	**$1,349,36**
339	1.4.1	Requirement document	95%	3/1/04	3/26/04	$9,14
340		Computing Req Doc Complete	0%	3/26/04	3/26/04	$0
341	**1.4.2**	**CS Prototype**	**0%**	**10/3/05**	**2/6/07**	**$330,67**
415	**1.4.3**	**CS Production**	**0%**	**8/14/07**	**4/7/09**	**$1,009,55**
517	**1.5**	**System Assembly**	**0%**	**4/4/07**	**9/16/10**	**$215,28**
518		**Lvl 2: Elec & Computing Subsys Ready for Prototype Assem.**	0%	4/4/07	4/4/07	$0
519	**1.5.1**	**Prototype**	**0%**	**4/5/07**	**6/11/07**	**$11,16**
531		**Level 1: CD-2B/CD-3B**	0%	7/10/07	7/10/07	$0
532		**Lvl 2: Prod Elec and Comp Subsys. Ready for Fi**	0%	6/12/09	6/12/09	$0
533	**1.5.2**	**Production**	**0%**	**6/15/09**	**2/23/10**	**$204,12**
570		**Level 1: CD-4: Approve Start of Operations**	0%	9/16/10	9/16/10	$0
571	**1.6**	**Project Management**	**15%**	**3/1/04**	**9/16/10**	**$2,454,26**
572	**1.6.1**	**Management**	**13%**	**3/1/04**	**9/16/10**	**$1,962,36**
573	**1.6.1.1**	**Initial phase (FY04-FY05)**	**73%**	**3/1/04**	**9/30/05**	**$478,48**
574		Contractor Project Manager - FY04	100%	3/1/04	9/30/04	$40,65
575		CPM - FY05	100%	10/1/04	2/28/05	$25,16
576		CPM - FY05 ETC	29%	3/1/05	9/30/05	$37,96
577		Project Engineer - FY04	100%	3/1/04	9/30/04	$129,42
578		Proj Engineer - FY05	100%	10/1/04	2/28/05	$64,74
579		Proj Engineer - FY05 ETC	29%	3/1/05	9/30/05	$90,90
580		Project Control Analyst - FY04	100%	3/1/04	9/30/04	$29,71
581		Project Controls Analyst - FY05	100%	10/1/04	2/28/05	$27,28
582		Project Controls Analyst - FY05 ETC	29%	3/1/05	9/30/05	$32,61



GRETINA Schedule April 2005

ID	Work Breakdow Ref	Task Name	% Comple	Start	Finish	Cost
583	**1.6.1.2**	**Long term**	**0%**	**10/3/05**	**9/30/09**	**$995,48**
587	**1.6.1.3**	**Final phase (~0.5 of FY10)**	**0%**	**10/1/09**	**9/16/10**	**$139,38**
592	**1.6.1.4**	Quality Assurance Manager	0%	4/1/05	12/22/09	$36,66
593	**1.6.1.5**	**Subsystem Managers**	**11%**	**3/1/04**	**11/3/09**	**$312,34**
594		Design Phase	100%	6/1/04	2/28/05	$45,82
595		Design ETC	17%	3/1/05	3/27/06	$25,75
596		Mechanical (Production)	0%	8/14/07	9/4/08	$29,23
597		Detector	18%	3/1/04	9/3/09	$0
598		Electronics	0%	8/1/05	8/13/09	$105,85
599		Computing Systems	0%	8/1/05	8/13/09	$93,09
600		Systems assembly	0%	6/15/09	11/3/09	$12,59
601	**1.6.2**	**General Project Expenses**	**18%**	**3/1/04**	**4/15/10**	**$491,90**
618	**1.7**	**Environment and Safety**	**29%**	**3/1/04**	**2/1/10**	**$108,89**
619	**1.7.1**	**Perform safety analysis of all subsystems**	**31%**	**3/1/04**	**4/14/09**	**$98,03**
636	**1.7.2**	Conduct global safety review	0%	1/26/10	2/1/10	$10,85



GRETINA
Cost & Contingency Analysis by WBS

WBS	Description	BAC @ CD1	Cont %	Current EAC	Cost Thru 03/05	ETC	Cont % of ETC	Cont k$
1.1	Mechanical	995	30%	1,005	160	845	27%	230
1.2	Detector Module	6,995	20%	8,150	245	7,905	12%	975
1.3	Electronics	1,710	31%	1,390	10	1,380	28%	380
1.4	Computing Systems	1,340	33%	1,350	10	1,340	29%	385
1.5	System Assembly	220	32%	215	-	215	28%	60
1.6	Project Management	2,500	13%	2,455	515	1,940	14%	275
1.7	Environment and Safety	140	20%	110	10	100	20%	20
1	Subtotal GRETINA	13,900	22%	14,675	950	13,725	17%	2,325
	Contingency:	-		-				
	Detector	1,400	20%	975		975	12%	
	All Other Subsystems	1,700	25%	1,350		1,350	23%	
	Total w/Contingency	17,000		17,000	950	16,050		

*** Ref MS Project file: GRETINA FY05 Baseline CB.mpp**

The table above shows the changes to cost and contingency as the result of the cost scrubbing and analysis exercise performed by the GRETINA staff. The most significant change is in the cost of detectors, driven by updates of the exchange ratio from $1.20 to ~ $1.34. The cost of preamplifiers has been moved from 1.3 Electronics to 1.2 Detectors, as we have decided to purchase them as part of the detector module from Eurysis.